

In the claims: The claims are as follows.

1. (Currently amended) A method for determining information about a carrier frequency of a signal transmitted by a possibly moving transmitter, the signal having a code component and a carrier component at the carrier frequency, the method comprising:

a) a step (100) of responding to successive approximately carrier-demodulated received signal fragments (102), and providing a set (104) of correlation results indicating information about the correlation of the successive approximately carrier-demodulated received signal fragments with phase-shifted replicas of the code component and any remaining carrier component, wherein the successive approximately carrier-demodulated received signal fragments are formed using different possible offsets from a nominal carrier frequency, and further wherein each element of the set (104) is provided as a phasor ($c_{p,m}$) having a magnitude and a phase; and

b) a step (106) of responding to the set (104) of phasors, selecting the phasor ($c_{p,m}$) having a magnitude distinguishing it from all the other elements ($c_{p,m}$) of the set (104), and determining the phase of the selected phasor;

wherein the step (100) of providing the set (104) of correlation results includes a step (11) of performing a coherent integration of each of a series of received signal fragments, and a step (12) of performing a non-coherent integration in which phasor results of the coherent integrations are combined without regard to phase; and

further wherein the step (12) of performing the non-coherent integration involves multiplying each element of a matrix of correlation results provided using a coherent integration of a first signal fragment, by the complex conjugate of a corresponding element for an immediately preceding signal fragment.

2. (Previously presented) A method as in claim 1, wherein the set (104) of correlation results is a matrix of correlation results, and further wherein the matrix of correlation results is spanned by an index (m) indicating an offset from a nominal carrier frequency and also by an index (p) indicating a replica code phase, and still further wherein the selected phasor ($c_{p,m}$) is the phasor having the maximum magnitude of all the elements of the set (104).

~~3. (Previously presented) A method as in claim 2, wherein the step (100) of providing the matrix of correlation results includes a step (11) of performing a coherent integration of each of a series of received signal fragments, and a step (12) of performing a non-coherent integration in which phasor results of the coherent integrations are combined without regard to phase.~~

~~4. (Original) A method as in claim 3, wherein the step (12) of performing the non-coherent integration involves multiplying each element of a matrix of correlation results provided using a coherent integration of a first signal fragment, by the complex conjugate of a corresponding element for an immediately preceding signal fragment.~~

3. Canceled.

4. Canceled.

5. (Original) A method as in claim 2, wherein in providing the matrix of correlation results as phasor values ($c_{p,m}$) and in determining the phase of the phasor having the maximum magnitude of all the elements of the matrix, only at most two phasor values ($c_{p,m}$) are held in a memory device at any instant of time, and of the two phasor values, only the phasor value ($c_{p,m}$) having the larger magnitude is saved in the memory device before calculating a next phasor value ($c_{p,m}$).

6. (Currently amended) An apparatus (23) for determining information about a carrier frequency of a signal transmitted by a possibly moving transmitter, the signal having a code component and a carrier component at the carrier frequency, the apparatus comprising:

a) means (300), responsive to successive approximately carrier-demodulated received signal fragments (302), for providing a set (304) of correlation results indicating information about the correlation of the successive approximately carrier-demodulated received signal fragments with phase-shifted replicas of the code component and any remaining carrier component, wherein the successive approximately carrier-demodulated received signal fragments are formed using different possible offsets from a nominal carrier frequency, and further wherein each element of the set (304) is provided as a phasor ($c_{p,m}$) having a phase and a magnitude; and

b) means (306), responsive to the set (304) of phasors ($c_{p,m}$), for selecting the phasor ($c_{p,m}$) having a magnitude distinguishing it from all the other elements ($c_{p,m}$) of the set (304), and determining the phase of the selected phasor ($c_{p,m}$), and for providing information about the carrier frequency based on the phase of the selected phasor ($c_{p,m}$);

wherein the means for providing the set (304) of correlation results includes means (31), responsive to a series of received signal fragments, for performing a coherent integration of each of the series of received signal fragments, and also means (32), responsive to the coherent integrations, for providing a non-coherent integration in which phasor results of the coherent integrations are combined without regard to phase; and

further wherein the means (32) for performing the non-coherent integration multiplies each element of a matrix of correlation results provided using a coherent integration of a first received

signal fragment, by the complex conjugate of a corresponding element for an immediately preceding received signal fragment.

7. (Previously presented) An apparatus as in claim 6, wherein the set (304) of correlation results is a matrix of correlation results, and further wherein the matrix of correlation results is spanned by an index (m) indicating an offset from a nominal carrier frequency and also by an index (p) indicating a replica code phase, and still further wherein the selected phasor ($c_{p,m}$) is the phasor having the maximum magnitude of all the elements of the set (304).

~~8. (Previously presented) An apparatus as in claim 7, wherein the means for providing the matrix of correlation results includes means (31), responsive to a series of received signal fragments, for performing a coherent integration of each of the series of received signal fragments, and also means (32), responsive to the coherent integrations, for providing a non-coherent integration in which phasor results of the coherent integrations are combined without regard to phase.~~

~~9. (Previously presented) An apparatus as in claim 8, wherein the means (32) for performing the non-coherent integration multiplies each element of a matrix of correlation results provided using a coherent integration of a first received signal fragment, by the complex conjugate of a corresponding element for an immediately preceding received signal fragment.~~

8. Canceled.

9. Canceled.

10. (Original) An apparatus as in claim 7, wherein in providing the matrix of correlation results as phasor values ($c_{p,m}$) and in determining the phase of the phasor having the maximum magnitude of

all the elements of the matrix, only at most two phasor values ($c_{p,m}$) are held in a memory device at any instant of time, and of the two phasor values, only the phasor value ($c_{p,m}$) having the larger magnitude is saved in the memory device before calculating a next phasor value ($c_{p,m}$).

11. (Currently amended) A system, including: a transmitter for transmitting a signal having a code component and a carrier component, and a ranging receiver for receiving the signal and for determining information about the carrier frequency of the signal, the ranging receiver characterized in that it comprises:

a) means (300), responsive to successive approximately carrier-demodulated received signal fragments (302), for providing a set (304) of correlation results indicating information about the correlation of the successive approximately carrier-demodulated received signal fragments with phase shifted replicas of the code component and any remaining carrier component, wherein the successive approximately carrier-demodulated received signal fragments are formed using different possible offsets from a nominal carrier frequency, and further wherein each element of the set (304) is provided as a phasor ($c_{p,m}$) having a phase and a magnitude; and

b) means (306), responsive to the matrix (304) of phasors ($c_{p,m}$), for selecting the phasor ($c_{p,m}$) having a magnitude distinguishing it from all the other elements ($c_{p,m}$) of the set (304), and determining the phase of the selected phasor ($c_{p,m}$), and for providing information about the carrier frequency based on the phase of the selected phasor ($c_{p,m}$);

wherein the means for providing the set (304) of correlation results includes means (31), responsive to a series of received signal fragments, for performing a coherent integration of each of the series of received signal fragments, and also means (32), responsive to the coherent integrations, for providing a non-

coherent integration in which phasor results of the coherent integrations are combined without regard to phase; and

further wherein the means (32) for performing the non-coherent integration multiplies each element of a matrix of correlation results provided using a coherent integration of a first received signal fragment, by the complex conjugate of a corresponding element for an immediately preceding received signal fragment.

12. (Previously presented) The system as in claim 11, further comprising a computing resource external to the ranging receiver, and wherein the apparatus communicates information to the computing resource via a wireless communication system and the computing resource provides at least some of the computation needed either to provide the set of correlation results or to determine the selected phasor ($c_{p,m}$).